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Barbara Haggerty
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IN THE UNITED STATES PATENT AND TRADEMARK OFFICE

Patent Application

Of: Shah et al.

For: Ruthenium-Containing Ultrasonically Coated Substrate For Use In A Capacitor And Method Of Manufacture

the specification of which is being transmitted herewith.

Assistant Commissioner for Patents
Washington, D.C. 20231

INFORMATION DISCLOSURE STATEMENT PURSUANT TO 37 CFR 1.56

1. Applicants submit herewith patents, publications or other information of which they are aware, which they believe may be material to the examination of this application and in respect of which there may be a duty to disclose in accordance with 37 CFR 1.56.

The filing of this information disclosure statement (IDS) shall not be construed as a representation that a search has been made (37 CFR 1.56(g)), an admission that the information cited is, or is considered to be material to patentability or that no other material information exists.

The filing of this IDS shall not be construed as an admission against interest in any manner (Notice of Jan. 9, 1992, 1135 O.G. 13-25, at 25).

2. Attached is Form PTO-1449. Legible copies of all items listed accompany this IDS.

3. A concise explanation of the possible relevance of the listed information items is as follows:

Patents:

U.S. Patent No. 5,680,292 to Thompson, Jr. et al. relates to the production of high surface area electrodes for use in electrical and electrochemical energy storage and conversion devices. The electrodes are comprised of conductive transition metal nitrides, carbides, borides or combinations thereof where the metal is molybdenum or tungsten.

U.S. Patent No. 5,464,453 to Tong et al. describes a method for fabricating an electrical storage device by coating a high surface area, electrically conducting material on a support surface. The porous coating material originates from various precursor solutions applied by any one of a number of techniques including dip coating, spray coating, roll coating, spin coating, doctor blading, electrophoretic deposition and chemical vapor deposition. For spray coating, the deposition process is described as taking place at a temperature up to 150°C by means of an ultrasonic or other spray nozzle with a flow rate of around 0.1 to 5 ml/min. in a carrier gas. At column 7, lines 1 to 9, Tong et al. teaches heating the substrate to a temperature of 0°C to 150°C as the substrate is being contacted with the ultrasonic spray of electrically conducting materials in an alcohol solvent. In particular, Example 1 uses a solvent of tert-butanol, Examples 2, 3 and 5 use isopropanol and Example 4 uses ethanol.

U.S. Patent No. 5,369,547 to Evans relates to a capacitor made by heating a titanium substrate to about 85°C. A solution of hydrated ruthenium chloride dissolved in isopropyl alcohol is then sprayed on to the substrate. If desires, a chloride of tantalum is added to the solution. At column 6, lines 27 to 30, Evans admits that the process of their invention is "conventional".

U.S. Patent No. 4,613,417 to Laskowski et al. describes a photoelectrochemical etching process for n-type and semi-insulating III-V semiconductor compounds containing aluminum or iridium in which a non-aqueous electrolyte is used.

U.S. Patent No. 5,213,851 to Snyder et al. discloses a process for preparing ferrite films including an ultrasonically generated aerosol mist which can contain nickel, manganese, iridium or cobalt along with iron for deposition onto a substrate. The aerosol/mist may be produced from solution by various conventional means including ultrasonic sound waves. Thereafter, the mist is subjected to radio-frequency radiation while in the plasma region.

U.S. Patent No. 3,840,391 to Spitz et al. is directed to the ultrasonic atomization of a solution to form a metal oxide aerosol for deposition on a heated substrate. The resulting thin oxide films may be nickel, cobalt or iridium deposited on a suitable substrate for forming catalysts, or as photo-masks in micro-electronics.

U.S. Patent No. 3,927,664 to Tsai et al. is directed to a process for applying an electrically insulative layer on a metal surface which comprises suspending an electrically insulative

powder in a highly volatile solvent by ultrasonic vibration. The suspension is then coated on a metal surface by brushing or spraying. The insulative layers are used, for example, between iron core layers in a transformer to minimize eddy currents at high frequencies. Suitable insulative powders include the oxides of alumina, titanium, strontium, nickel, manganese, zinc, magnesium and silicon. The use of ultrasonic energy to form a suspension is not similar to the deposition of an ultrasonically generated aerosol spray.

U.S. Patent No. 5,366,770 to Wang relates to an aerosol plasma deposition process for coating a nickel substrate with yttria-stabilize zirconia. The resulting product can be formed into a ceramic superconductor composite wire. In the process, an aerosol mist containing reactants necessary to form the coating is first provided and then the mist is subjected to radio-frequency radiation while in the plasma region. The aerosol/mist consisting of gas-suspended liquid particles may be produced from a solution by various conventional means including ultrasonic soundwaves.

U.S. Patent No. 5,100,868 to Snyder et al. relates to a process for preparing superconducting films by radio-frequency generated aerosol plasma deposition. In the process, an aerosol mist containing reactants is subjected to radio-frequency radiation while in the plasma region and thereafter deposited onto an electrically grounded substrate. The aerosol/mist containing calcium/barium/strontium/copper precursor materials may be produced from solution by various conventional means including ultrasonic sound waves.

U.S. Patent No. 5,376,402 to Louks et al. provides an ultrasonically assisted coating method wherein an ultrasonic energy source excites the line of contact between a liquid coating material such as a 5,000 cps solvent-based rubber coating and a web to create a coated web having a substantially uniform cross web thickness. The web can be of polyester, polypropylene, paper, or other non-woven materials. Preferably, the ultrasonic energy is applied through the back surface of the web.

U.S. Patent No. 3,649,358 to Johnston II is concerned with the controlled reduction in viscosity of a non-Newtonian liquid, prior to its application as a coating, in a treatment chamber with one or more transducer elements imparting ultrasonic vibration to the liquid. Non-Newtonian liquids are characterized generally as having a viscosity which is not constant at a given temperature and include Bingham plastics, (vaseline and petroleum jelly), pseudo plastic liquids, dilitant liquids, thixotropic liquids and the rheopectic liquids. One embodiment describes applying a non-Newtonian coating onto another surface such as in the formation of magnetic recording tape wherein a magnetizable ink composed of finely divided iron oxide suspended in a lubricated binder is coated on a matrix or web.

U.S. Patent No. 5,098,485 to Evans is cited in the specification for its disclosure related to improving the electrical conductivity of the substrate prior to aerosol deposition.

4. The remaining patents and publications on the attached Form PTO-1449 were located during a patentability search or cited by the examiner in the parent applications.

5. The person making this statement is the agent who signs below, who makes this statement on the information supplied by the inventors and the information in the agent's file.

Respectfully Submitted,

By _____
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